

RAILROAD ACCIDENT INVESTIGATION

Report No. 4113

THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD COMPANY

ATTLEBORO, MASS.

DECEMBER 10, 1966

Department of Transportation
Federal Railroad Administration
Washington

Summary

DATE:	December 10, 1966
RAILROAD:	New York, New Haven & Hartford
LOCATION:	Attleboro, Mass.
KIND OF ACCIDENT:	Derailment
TRAIN INVOLVED:	Passenger
TRAIN NUMBER:	170
LOCOMOTIVE NUMBERS:	Diesel-electric units 2041, 2035
CONSIST:	11 cars
SPEED:	72 m p h
OPERATION:	Signal indications
TRACKS:	Four; tangent; 0.54 percent ascending grade eastward
WEATHER:	Foggy
TIME:	3:17 p.m.
CASUALTIES:	35 injured
CAUSE:	Broken portion of a brake shoe falling to the top of the rail in such manner that it wedged under and derailed wheels of the truck to which it had been attached

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION
RAILROAD SAFETY BOARD

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Synopsis

On December 10, 1966, at Attleboro, Mass., there was a derailment of a passenger train on the New York, New Haven and Hartford Railroad. Two dining-car employees and thirty-three passengers were injured

The accident was caused by a broken portion of a brake shoe falling to the top of the rail in such manner that it wedged under and derailed wheels of the truck to which it had been attached.

Location and Method of Operation

The accident occurred on that part of the Boston Division extending between Providence, R. I., and Boston, Mass., a distance of 43.8 miles. In the accident area this is a four-track line over which trains operating with the current of traffic are governed by signal indications of an automatic block-signal system, supplemented by a cab-signal system. From the north the main tracks are designated as No. 3, westward; No. 1, westward; No. 2, eastward, and No. 4, eastward. An interlocking designated as S.S. 165 is located at Attleboro, 11.9 miles east of Providence. The interlocking station is on the south side of the tracks, 1,554 feet east of the Attleboro station. A series of crossovers

connect the main tracks within the interlocking limits, as shown in the sketch appended to this report. Crossover No. 48 connects tracks No. 1 and No. 2. It is 279 feet in length. The east switch of this crossover is 708 feet west of Attleboro station and is trailing point for eastbound movements on track No. 2. Crossover No. 47 connects tracks No. 2 and No. 4. It is 278 feet in length. The west switch of the crossover is 30 feet east of the east switch of crossover No. 48 and is facing point for eastbound movements on track No. 2.

The initial derailment occurred on track No. 2 within interlocking limits, about 8 feet west of the east switch of crossover No. 48 and 716 feet west of Attleboro station. The general derailment occurred on track No. 2, at the frog of the west turnout of crossover No. 47.

Semi-automatic signal No. 7, governing eastbound movements on track No. 2, is 320 feet west of the initial derailment point. The operator at S.S. 165 interlocking station may cause this signal to indicate Stop. Otherwise, it functions as an automatic signal.

Details concerning the main tracks, train involved, damages, and other factors are set forth in the appendix.

Description and Discussion

No. 170, an eastbound first-class passenger train consisting of 2 diesel-electric units and 11 cars, left Providence at 3:04 p.m., 11 minutes late, on the day of the accident. It passed Woodlawn, 3 7 miles east of Providence at 3:09 p.m., 11 minutes late. About 8 minutes later, it passed signal 7, which displayed a Clear aspect, and entered S.S. 165 interlocking. Moments later, while it was moving eastward on track No. 2 at 72 miles per hour, the rear wheels of the front truck of the 2nd car derailed to the south, 716 feet east of the Attleboro station and about 8 feet west of the east switch of crossover No. 48. Immediately thereafter, the rear truck of the 1st car and both trucks of the 2nd to 11th cars, inclusive, derailed at the frog of the west turnout of crossover No. 47. The brakes of the train became applied in emergency as a result of the derailment. None of the crew members was aware of anything being wrong before this time.

Thirty-three passengers and two dining-car employees were injured.

Examination of track No. 2 throughout a considerable distance west of the initial derailment point disclosed no evidence of dragging equipment or of an obstruction having been on the track. It also disclosed no evidence that a

defective track condition contributed to the cause of the accident

The first mark of derailment was a wheel mark on a pipe connection to a gas heater for the east switch of crossover No. 48. It appeared at a point $7\frac{1}{2}$ inches south of the field side of the south rail and about 8 feet west of the east switch of crossover No. 48. It indicated that a pair of wheels, apparently the rear wheels of the front truck of the 2nd car, had derailed to the south at this point. Four feet 2 inches farther eastward, a wheel mark appeared on a switch rod for the east switch of crossover No. 48, 11 inches south of the gage side of the north rail. Eight inches farther eastward, a pair of wheel marks appeared on switch plates, 11 inches from the gage side of the north rail and 11 inches from the field side of the south rail. Wheel marks on the field side of the south rail extended eastward on the ties to the west turnout of crossover No. 47. At a point about 60 feet east of the switch of this turnout, a scrape mark appeared on the field side of the head of the south rail of the turnout. It extended about 50 feet eastward to the frog of the turnout, indicating that the derailed pair of wheels had been diverted southward at the turnout and had struck the frog, causing the general derailment. Eastward from the frog, the structure of track No. 2 was destroyed or heavily damaged throughout a considerable distance.

Examination of the train equipment disclosed that a portion of the brake shoe was missing from the brake head of the clasp type brake rigging in front of the rear wheel on the south side of the front truck of REX 6372, the 2nd car. The missing portion of the brake shoe, which was not recovered after the accident, was apparently $5\frac{1}{2}$ inches long, $3\frac{1}{2}$ inches wide and $1\text{-}5/8$ inches thick. Examination of the remaining portion of the brake shoe disclosed evidence that the balancing feature of the brake head had been ineffective. Apparently as a result of the imbalance and a normal amount of slack in the brake rigging, there was sufficient clearance between the brake shoe and the tread of the wheel to permit the broken portion of brake shoe to become dislodged and fall to the top of the south rail. The broken off portion of the brake shoe apparently then became wedged between the wheel and rail, derailing the wheel. No other condition of the train equipment which could have contributed to the cause of the derailment was found.

Findings

It is apparent that as No. 170 approached Attleboro, the brake shoe attached to the brake head in front of the rear wheel on the south side of the front truck of the

second car was broken. The broken portion of the brake shoe apparently became dislodged and fell to the top of the south rail, where it became wedged between the rail and the wheel, causing the derailment.

Cause

This accident was caused by a broken portion of a brake shoe falling to the top of the rail in such manner that it wedged under and derailed wheels of the truck to which it had been attached.

Dated at Washington, D. C. this
3rd day of August 1967.

By the Federal Railroad Admin-
istration, Railroad Safety
Board.

(SEAL)

Bette E. Holt
Acting Executive Secretary

Appendix

Tracks

The main tracks are tangent a considerable distance east and west of the derailment point. The grade in this area is 0.54 percent ascending eastward.

The track structure in the derailment area consists of 131-pound rail, 39 feet in length, laid new in 1943 on an average of 24 treated ties to the rail length. It is fully tie plated with double-shoulder tieplates, spiked with 2 rail-holding spikes per tie plate and is provided with 6-hole, 36-inch joint bars and an average of 8 rail anchors per rail length. It is ballasted with crushed stone to a depth of 10 inches below the ties.

Train Involved

No. 170 consisted of car-body type diesel-electric units 2041 and 2035, coupled in multiple-unit control, 1 express-box car, 2 refrigerator-express cars, 5 coaches, 1 dining car, 1 parlor car and 1 parlor-lounge car, in that order. The cars were of all-steel construction. The 4th to 11th cars, inclusive, were equipped with tightlock couplers. Prior to departure from New Haven, Conn., 113 miles west of Providence, where locomotive power was changed, the equipment in the consist of this train was inspected by mechanical department employees and no defective conditions were noted. As the train approached the derailment point, the engineer and fireman were in the control compartment at the front of the first diesel-electric unit. The other crew members were at various locations in the cars. The brakes had been tested and had functioned properly when used en route.

REX 6372, the second car of No. 170, a passenger refrigerator-express car, was of all-steel construction and was built in 1948. Its lightweight, nominal capacity and load limit were, respectively, 80,100, 65,800, and 66,800 pounds. The outside width, height and length over strikers were, respectively, 9 feet 7 inches, 13 feet 3 inches and 51 feet 10 inches. It was provided with two 4-wheel swing-bolster equalized trucks spaced 40 feet 10 inches between truck centers. The wheel base of each truck was 6 feet 6 inches. The trucks were provided with 33-inch multiple-wear wrought-steel wheels, 5½-inch by 10-inch journals, roller bearings, and clasp brakes.

The brake shoe involved was the pattern C-59 unflanged, cast iron type with beveled ends. It was manufactured by the American Brake Shoe Company (ABEX). When new this type of brake shoe measures 16-¾ inches in length and the

friction braking surface is 13-3/4 inches long, 3½ inches wide, and 2¼ inches thick.

Damages

A separation occurred between the first and second cars. The locomotive and first car stopped with the front of the locomotive 1.0 mile east of the initial derailment point. The rear truck of the first car and both trucks of the second to eleventh cars, inclusive, were derailed. The first car stopped upright on and in line with the structure of track No. 2. The second car stopped upright with the front end on the structure of track No. 4, 3,973 feet to the rear of the first car, and with the rear end on the structure of track No. 2. The third to the eleventh cars, inclusive, stopped upright on and in line with the structure of track No. 2. All eleven cars were slightly damaged.

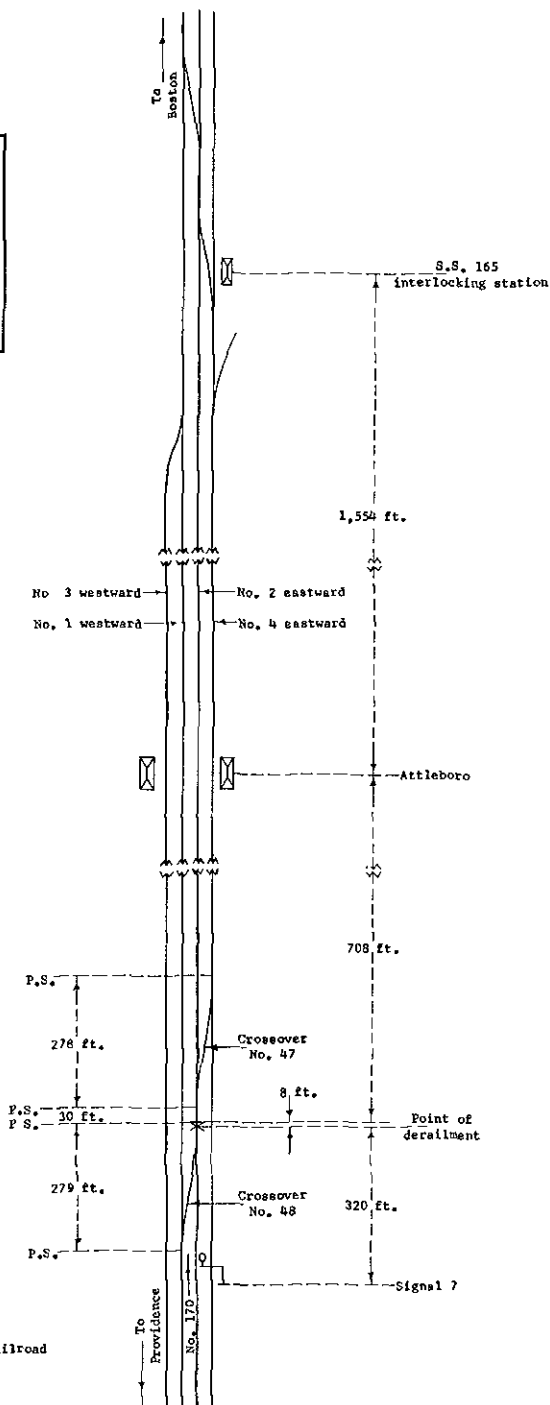
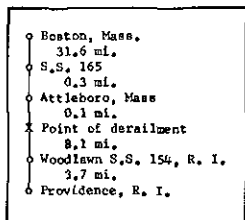
Other Factors

The accident occurred at 3:17 p.m., in foggy weather.

The maximum authorized speed for passenger trains in the accident area is 79 miles per hour.

According to their daily time returns, the engineer and fireman had been on duty 9 hours 17 minutes at the time of the derailment, after having been off duty 24 hours. The conductor and flagman had been on duty 4 hours 27 minutes after having been off duty 16 hours, and the front brakeman had been on duty 4 hours 27 minutes after having been off duty 4 hours 40 minutes.

This accident was investigated in conjunction with representatives of the Massachusetts Department of Public Utilities.



The New York, New Haven and Hartford Railroad
 Attleboro, Mass.
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